NON-PUBLIC?: N
ACCESSION #: 8903230410
LICENSEE EVENT REPORT (LER)

FACILITY NAME: PLANT VOGTLE - UNIT 1 PAGE: 1 OF 5

DOCKET NUMBER: 05000424

TITLE: Failed Potential Transformer Leads to Turbine/Reactor Trip
EVENT DATE: 07/14/88 LER #: 88-022-01 REPORT DATE: 03/16/89

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: J. E. Swartzwelder
Nuclear Safety and Compliance Manager TELEPHONE: 404-826-3618

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: TL COMPONENT: XPT MANUFACTURER: W120
B TL 25 G084
B TL RG G084

REPORTABLE TO NPRDS: N
N
N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On July 14, 1988, at 1901 CDT, a generator/turbine/reactor trip occurred as a result of an overexcitation condition on the generator field. Control rods inserted. The Main Feedwater system isolated and the Auxiliary Feedwater system actuated. Control room operators responded properly to assist in plant stabilization.

An investigation revealed that the failure of a potential transformer caused an electrical transient which led to circuit board failures in the generator control system and an increase in excitation voltage.

Corrective action includes replacement of the failed potential transformer and circuit boards.

END OF ABSTRACT

A. REQUIREMENT FOR REPORT

This report is required per 10CFR50.73 (a)(2)(iv) because an unplanned actuation of the Reactor Protection System occurred.

B. UNIT STATUS AT TIME OF EVENT

At the time of this event, Unit 1 was in Mode 1 (Power Operations) at 100% rated thermal power. Other than the failures described herein, there was no inoperable equipment which contributed to the occurrence of this event.

C. DESCRIPTION OF EVENT

On July 14, 1988, at 1901 hours CDT, the control room received the following annunciations associated with a concurrent main generator/turbine/reactor trip:
Generator Overvoltage Lockout Relay Trip

Generator Transformer Overexcitation Lockout Relay Trip

Generator Voltage Regulator Alarm

Generator Excitation Cubicle Alarm

Generator Voltage Regulator PT Signal Failed.

A normal turbine/reactor trip occurred. Control rods inserted. The Main Feedwater system isolated and the Auxiliary Feedwater system actuated. Control room operators responded properly to assist in plant stabilization. Review of the plant fault recorder tracings revealed that the generator trip was initiated by an overexcitation condition on the generator field, which was sensed by the Volts/Hertz relay.

Further investigation immediately after the event revealed that a primary side fuse had blown in phase A of the relaying and metering potential transformers (PT's) 2A, 2B, 2C. This fuse was replaced, all other primary and secondary PT fuses were checked, circuit wiring was verified, and the PT was ratio tested and meggered.

On July 15, 1988, a vendor (General Electric - GE) field representative performed preliminary checks of the generator control system's (GENERREX) voltage regulator and could find no deficiencies. It was decided to perform

additional tests of the GENERREX system and to replace all primary PT fuses prior to any attempts to restart the unit. Recorders were attached to the voltage regulator and exciter.

At approximately 2100 hours on July 15, 1988, the GE field representative discovered that the field voltage regulator circuit board in the GENERREX system was malfunctioning. This circuit board was replaced and troubleshooting continued.

At approximately 0230 hours on July 16, 1988, during an attempt to excite the generator under controlled test conditions, it was noticed that the generator field was again being overexcited. The generator field shorting breaker was manually closed to remove excitation from the generator. Analysis of the recorder tracings and further calibration checks revealed that the GENERREX synchronizing circuit board was malfunctioning. The circuit board was replaced.

At approximately 2130 hours on July 16, 1988, it was discovered that the PT 2A primary fuse had again blown. The fuse was replaced and the PT was again meggered with satisfactory results. At this time it was decided that the PT should undergo high potential (HIPOT) testing. A HIPOT test was performed and the results showed that the PT was defective. The PT was removed and replaced.

Analysis of this event has led to the conclusion that the defective PT caused the primary fuse to blow. The ensuing transient caused a malfunction in the generator voltage regulator synchronizing circuit which in turn caused an increase in excitation voltage. This increased excitation was sensed by the Volts/Hertz relay which subsequently initiated the generator/turbine/reactor trip.

D. CAUSE OF EVENT

The direct cause of this event is attributed to component failure in the relaying/metering potential transformer 2A, which caused the primary fuse to blow. The resultant transient caused the GENERREX voltage regulator to malfunction, increasing generator voltage to the Volts/Hertz relay setpoint, which subsequently initiated a generator/turbine/reactor trip.

The root cause of this event is attributed to component failure in the GENERREX exci
ation system. Failure of the synchronizing circuit board led to an overvoltage condition being applied from the GENERREX system, causing an overexcitation relay to initiate a generator trip.

E. ANALYSIS OF EVENT

When the turbine tripped, the reactor also tripped as designed. Main feedwater isolated and the Auxiliary Feedwater system actuated. Control room operators responded properly by stabilizing the plant in Mode 3 (Hot Standby). Based on these considerations, it is concluded that there was no adverse effect on plant safety or public health and safety as a result of this event.

F. CORRECTIVE ACTIONS

1. All primary PT fuses were replaced.

2. PT 2A was replaced.

3. The malfunctioning circuit boards in the GENERREX system were replaced.

4. The GENERREX system's operational history has been evaluated and additional adjustments are not considered necessary at this time. Engineering review of design enhancements to the present GENERREX system will continue to be performed as part of the Trip Reduction Program.

5. The failed PT was analyzed and a winding failure was identified.

6. Improved test methods to detect this type of PT failure were evaluated. However, a more appropriate test method has not been identified.

G. ADDITIONAL INFORMATION

1. Failed Components

a) Potential Transformer manufactured by Westinghouse Electric Corp.

Style: CG74700A 24960volts/120volts

b) Field Voltage Regulator Circuit Board manufactured by General Electric Co.

Model: 44C331880-G01

c) Synchronizing Circuit Board manufactured by General Electric Co.

Model: 44C331890-G01

2. Previous Similar Events

None

3. Energy Industry Identification System Code

Main Generator Excitation System - TL

Main Feedwater System - SJ

Auxiliary Feedwater System - BA

Control Rod Drive System - AA

ATTACHMENT 1 TO 8903230410 PAGE 1 OF 1

ELV-00249

March 16, 1989 0149e

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

PLANT VOGTLE - UNIT 1
NRC DOCKET 50-424
OPERATING LICENSE NPF-68
LICENSEE EVENT REPORT
FAILED POTENTIAL TRANSFORMER
LEADS TO TURBINE/REACTOR TRIP

Gentlemen:

In accordance with the requirements of 10 CFR 50.73, Georgia Power Company hereby submits a supplemental Licensee Event Report (LER) concerning a Turbine/Reactor trip due to generator overexcitation. This supplement updates the status of the corrective actions (page 4).

Sincerely,

W. G. Hairston, II

TEW/cdt

Enclosure: LER 50-424/1988-022-01

xc: Georgia Power Company
Mr. P. D. Rice
Mr. C. K. McCoy
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